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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,331	10/04/2002	Pierino Bonanni	121601-1	2194

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
LE, JOHN H	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/065,331	BONANNI ET AL.	
	Examiner	Art Unit	
	John H Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,11,23,24,26 and 29-31* is/are rejected.

7)☒ Claim(s) *6-10,12-22,25,27,28 and 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 December 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. This office action is in response to applicant's response received on 07/27/2004.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5, 11, 23-24, 26, 29-31, are rejected under 35 U.S.C. 103(a) as being unpatentable over Khalid (USP 6,231,306) in view of Banaszuk et al. (USP 6,522,991).

Regarding claims 1, 5, 11, and 23, Khalid teaches a system for detecting precursors to compressor stall/surge 116 comprising at least one sensor 132 positioned at said compressor 116 to monitor at least one compressor parameter (e.g. Col.2, lines 59-65), said at least one sensor outputting raw data representative of said at least one compressor parameter (e.g. Figs.1, 2, Col.3, lines 6-26), said pre-processing being at least partially performed in the digital domain; said pre-processing being at least partially performed in the analog domain (e.g. Col.4, lines 52-62).

Regarding claims 2 and 24, Khalid teaches monitoring the static pressure of gasses flowing through the compressor (e.g. Col.3, lines 6-10).

Regarding claim 3, Khalid teaches monitoring dynamic pressure at least one location within said compressor (Col.2, lines 59-65).

Khalid fails to teach a frequency demodulator receiving said raw data, demodulating said raw data, and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data.

Banaszuk et al. teach a frequency demodulator (frequency tracking predictor 35) receiving said raw data (pressure signal), demodulating said raw data (Col.2, lines 44-54), and producing demodulated data (e.g. Fig.2, Col.2, line 55-Col.3, line 30); a Kalman filter obtaining stall precursors from said demodulated data (e.g. Fig.2, Col.2, line 55-Col.3, line 30).

Regarding claim 26, Banaszuk et al. teach a pre-filter to reject undesirable signals from said raw data prior to being input into said frequency demodulator (e.g. Col.3, lines 4-18).

Regarding claim 29, Khalid teaches demodulator operates on said raw data in the analog domain (e.g. Col.4, lines 61-62).

Regarding claim 30, Khalid teaches demodulator operates on said raw data in the digital domain (e.g. Col.4, lines 52-62).

Regarding claim 31, Banaszuk et al. teach a low-pass filter filtering the demodulated data to reduce noise interference prior to being input into the Kalman filter (e.g. Col.3, lines 18-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a frequency demodulator and a Kalman filter as taught by Banaszuk et al. in a control system for preventing a compressor stall in a gas turbine engine of Khalid for purpose of providing controlling any actuation mechanism that

affects the level of pressure oscillations and allows parameter update in a scale faster than that of the operating conditions and slower than that of the dynamics being regulated, to suppress pressure oscillations or other parameters (Banaszuk et al., Col.2, lines 110-16).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Khalid (USP 6,231,306) in view of Banaszuk et al. (USP 6,522,991) as applied to claims 1-3 above, and further in view of Patterson et al. (USP 5,448,881).

Regarding claim 4, the combination of Khalid and Banaszuk et al. discussed supra, disclose the claimed invention except monitoring dynamic pressure at a plurality of locations within said compressor.

Patterson et al. disclose monitoring dynamic pressure at a plurality of locations within said compressor (e.g. Col.3, lines 21-43).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include monitoring dynamic pressure at a plurality of locations within said compressor as taught by Patterson et al. in a control system for preventing a compressor stall in a gas turbine engine of Khalid in view of Banaszuk et al. for purpose of providing a high responsive static pressure sensor array and processing system for combined use in the calculation of inlet face distortion and in the recognition of stall precursors associated with near-stall operation (Patterson et al., Col.2, lines 45-50).

Allowable Subject Matter

5. Claims 6-10, 12-22, 25, 27-28, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In combination with other limitations of the claims, the cited prior arts fails to teach sampling and digitizing signals representing said at least one compressor parameter to obtain time-series analyzed data, as recited in claim(s) 6.

In combination with other limitations of the claims, the cited prior arts fails to teach pre-filtering time-series signals representing said at least one compressor parameter to reject undesirable signals; frequency demodulating the filtered signal to produce a demodulated signal having an amplitude corresponding to the instantaneous frequency of a locally dominant component of the input signal, and low pass filtering the demodulated signal to reduce noise interference to produce preprocessed signals, as recited in claim(s) 12.

In combination with other limitations of the claims, the cited prior arts fails to teach the Kalman filter computes a filtered estimate of locally dominant components of the preprocessed data, as recited in claim(s) 17.

In combination with other limitations of the claims, the cited prior arts fails to teach a calibration system for sampling and digitizing output from said at least one sensor to obtain time-series analyzed raw data, said frequency demodulator receiving said time-series analyzed raw data, as recited in claim(s) 25.

In combination with other limitations of the claims, the cited prior arts fails to teach a pre-filter to reject undesirable signals from said raw data prior to being input into said frequency demodulator, said pre-filter comprises a band-pass filter centered on a locally dominant component of the input signal, as recited in claim(s) 27.

In combination with other limitations of the claims, the cited prior arts fails to teach a stall precursor measure system computing a standard deviation of innovations of said Kalman filter to determine a stall precursor signal, as recited in claim(s) 32.

Response to Arguments

6. Applicant's arguments filed 07/27/2004 and 03/22/2004 have been fully considered but they are not persuasive.

-Applicant argues that the prior did not teach "a frequency demodulator" and "a Kalman filter".

Examiner position is that Banaszuk et al. teach "a frequency demodulator" (frequency tracking predictor 35) receiving said raw data (pressure signal), demodulating said raw data (Col.2, lines 44-54), and producing demodulated data (e.g. Fig.2, Col.2, line 55-Col.3, line 30); "a Kalman filter" obtaining stall precursors from said demodulated data (e.g. Fig.2, Col.2, line 55-Col.3, line 30).

Conclusion

7. Specifically Banaszuk et al. and Patterson et al. have been added to an other ground of rejection.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

September 8, 2004

John Barlow
Supervisory Patent Examiner
Technology Center 2800